

September 26, 2008

MEMO TO: Andy Kugler, Acting Branch Chief  
Environmental Projects Branch 2  
Division of Site and Environmental Reviews

MEMO FROM: Linda Tello, Project Manager /RA/  
Environmental Projects Branch 2  
Division of Site and Environmental Reviews

SUBJECT: SUMMARY OF THE ENVIRONMENTAL SITE AUDIT RELATED TO THE  
REVIEW OF THE COMBINED OPERATING LICENSE APPLICATION  
FOR WILLIAM STATES LEE III, UNITS 1 & 2

From April 28 to May 02, 2008, the U.S. Nuclear Regulatory Commission (NRC) staff and their contractors from Pacific Northwest National Laboratory (PNNL) participated in an environmental site audit, related to the review of the combined license (COL) application submitted by Duke Energy Carolinas, LLC (Duke). The primary goal of the site audit was to review documentation in the Environmental Report (ER) as part of the COL application, visit the proposed site and alternative site locations, and to interface with officials in state and federal government agencies.

This report provides a summary of the audit and site tour. Enclosure 1 is a list of agencies that participated in the environmental site tour and audit, and an itinerary of each day's activities. Enclosure 2 is the trip report submitted by PNNL summarizing the main discipline area reviews. The additional information needs submitted to Duke prior to the site audit can be found in the NRC's Agency Documents Access and Management System (ADAMS), under accession number ML082681132, which is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. Note that the Uniform Resource Locator (URL) is case-sensitive.

Monday of the site audit week, Duke personnel led a small NRC and PNNL team on a tour of the three alternative sites. Those sites were located in Davies County, North Carolina and Oconee and Anderson Counties in South Carolina. In addition, another small NRC team of geologists were on the Lee Site in Gaffney, South Carolina reviewing the geological attributes of the site.

Tuesday, after a safety briefing and introductions, Duke led NRC staff and other agency attendees on a tour of the Lee Site. The tour included stops at the two make-up ponds, the

CONTACT: Linda Tello, NRO/DSER/RAP2  
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Ninety-Nine Islands Dam, the proposed intake and discharge locations, and the reactor core excavation. Some staff went on discipline-specific tours, such as emergency evacuation routes; a boat tour along the Broad River for the ecologists and hydrologists; meteorological towers; and proposed railroad corridors. At the end of the day, the NRC team met with the Army Corps of Engineers (USACE); U.S. Fish and Wildlife (FWS); North Carolina Wildlife Resources Commission; Environmental Protection Agency, Region 4; South Carolina Department of Natural Resources; and South Carolina Department of Health and Environmental Control to understand their processes and interactions with Duke. The discussions were centered on the roles and processes of the various agencies.

Wednesday, the team met at the Duke headquarters offices in Charlotte, North Carolina to review documentation referenced in the ER and discuss issues with the Duke staff. In the morning, Duke gave a quick presentation on the Broad River water usage plan for the Lee Site, which was followed by discipline area break-out sessions for the rest of the day. At the end of the day, NRC provided a quick summary to Duke of the day's progress for each discipline area.

Thursday, the team returned to the Duke offices to continue their document review and discussions. Some of the NRC and PNNL team met with local governmental officials in preparation for the public scoping meeting that evening.

Friday, the team wrapped up their discussions and reviews. NRC held a close-out meeting with Duke to summarize the week's activities, highlight issues raised during the audit, and to determine when documents would be provided to the staff. Duke committed to providing responses to the team's requests as soon as possible.

If you have any questions or comments, please call me at (301) 415-2907 or via email at [Linda.Tello@nrc.gov](mailto:Linda.Tello@nrc.gov) or Ms. Jessie Muir at (301) 415-0491 or via email at [Jessie.Muir@nrc.gov](mailto:Jessie.Muir@nrc.gov).

Docket Nos.: 52-018 and 52-019

Enclosures:  
As stated

cc w/enclosures: See next page

William States Lee III Nuclear Station

Revised: 10-Oct-08

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If you have any questions or comments, please call me at (301) 415-2907 or via email at [Linda.Tello@nrc.gov](mailto:Linda.Tello@nrc.gov) or Ms. Jessie Muir at (301) 415-0491 or via email at [Jessie.Muir@nrc.gov](mailto:Jessie.Muir@nrc.gov).

Docket Nos.: 52-018 and 52-019

Enclosures:  
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cc w/enclosures: See next page

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**\*See previous concurrences**

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\*Attended only the geology site tour on Monday, April 28, 2008.

## SITE AUDIT DAILY ITINERARY

### Tuesday, April 29, 2008

- 9:00 - 9:30 Arrival and Check-in
- 9:30 -10:00 Safety Briefing and Orientation
- 10:00 -12:00 General Site Tour
- 12:00 - 1:00 Lunch
- 1:00 - 4:00 Specialty Tours and Breakout Sessions
- 4:00 - 5:00 Meeting with State and Federal Agencies

### Wednesday, April 30, 2008

- 7:30 - 8:00 Arrival and Check-in
- 8:00 - 8:30 Presentation on Site Selection Process and Water Usage
- 8:30 -12:00 Breakout Sessions
- 12:00 - 1:00 Lunch
- 1:00 - 4:30 Breakout Sessions
- 4:30 - 5:00 NRC Summary
- 5:00 - 5:30 NRC-Duke Debrief

### Thursday, May 1, 2008

- 7:30 - 8:00 Arrival and Check-in
- 8:00 -12:00 Breakout Sessions
- 12:00 - 1:00 Lunch
- 1:00 - 2:00 Breakout Sessions
- 2:00 - 2:30 NRC Summary
- 2:30 - 3:00 NRC-Duke Debrief
- 3:00 - 5:00 NRC Leave for Scoping Meeting
- 5:00 - 7:00 Open House, Gaffney
- 7:00-10:00 Scoping Meeting, Gaffney

### Friday, May 2

- 9:00 - 9:30 Arrival and Check-in
- 9:30 -11:00 Breakout Session Follow-up
- 11:00-12:00 NRC Close Out
- 12:00 - 1:00 NRC-Duke Close Out

Site Audit Trip Report  
William States Lee III Nuclear Station COL  
(Duke Energy Carolinas, LLC)

April 28 – May 2, 2008

The U.S. Nuclear Regulatory Commission (NRC), and Pacific Northwest National Laboratory (PNNL) submitted a list of additional information needs prior to the site audit; Duke Energy (Duke) made many documents available during the audit in response to these requests. However, due to the volume of documents presented during the breakout sessions, NRC and PNNL reviewers required more time than was available to complete a thorough review of the applicant's documentation. Duke agreed at the closeout of the site audit to set up reading rooms in Richland, Washington and near NRC offices in Rockville, Maryland for the staff to complete their reviews. The reading rooms have been made available and the document reviews are ongoing. Requests for additional information were issued on August 25, 2008.

#### SUMMARY OF TECHNICAL DISCUSSIONS AND ISSUES

The site proposed for the William States Lee III (Lee) nuclear plant is located at the site of previous construction for the Cherokee Nuclear Plant, which was not completed. Previous construction has been removed from the site. The site contains the excavation for the original reactors and two cooling ponds.

#### Aquatic Ecology

The aquatic ecology team visited Make-up Ponds A and B, the location of the proposed intake structure and the discharge point above Ninety-Nine Islands Dam. Duke Energy is currently looking at other options to increase water storage capacity beyond Pond B.

Duke Energy's expected construction schedule for the intake and discharge structures was discussed. The work needs to be coordinated with the U.S. Army Corps of Engineers (USACE), the South Carolina (SC) Department of Natural Resources (DNR), and other agencies that have established permitting requirements for work in waterways. Duke may do additional data collection to assess the potential impacts associated with entrainment.

The need for further modeling of low flow events was discussed. The modeling would help ecologists determine the level of impacts to the small mouth bass population below the Ninety-Nine Islands Dam.

Discussions were held with the applicant on the life history of resident and migratory fish species in the vicinity of the intake and discharge structures. Special attention was given to the estimated magnitude of the impingement and entrainment impacts on aquatic species populations and the aquatic ecosystem. Fish species and spawning information was provided verbally. There are approximately two miles of river between Cherokee Dam and Ninety-Nine Islands Dam. No larval fish sampling has been performed.

The aquatic impacts of construction and maintenance of the two new transmission line corridors and the minimization procedures proposed by Duke were discussed.

### Terrestrial Ecology

Duke's consulting biologists (Enercon) are unsure how much forest would be disturbed onsite by the project, as plans are evolving. The intake and discharge construction plans were anticipated to be done by the end of 2008 (enough to allow permitting of these structures), and the location of the underground pipelines between Ponds A and B are still unknown. The location of laydown areas are expected to be established by the end of 2008.

Up through the time of the site audit, Duke had gathered little information about the maximum and minimum projected drawdown of Ponds A and B and the duration of drawdowns under normal and drought conditions - particularly in relation to potential impacts to wetlands and wildlife around the margins of the ponds. Provided information was limited to a level and surface area for Pond B of 570 ft MSL and 154.39 ac at full pool and 530 ft MSL and 13.49 ac at minimum pool. When Pond A is drawn down, dredging was suggested to increase pond capacity. If that were to be done, the disposition of the spoils and effects on wetlands would need to be determined.

There is a need to look at the old wetlands permit from the construction that was done in the 1970s to see what the terms and conditions were and whether or not they were fulfilled. The mitigation or compensation measures undertaken during the initial construction of Ponds A and B are of particular interest. This suggestion came from the USACE during the site audit and will be the subject of an inquiry by South Carolina Department of Health and the Environmental Control (DHEC).

The final routing of the rail spur was still under discussion with the landowner during the site audit. If the final routing of the rail spur traverses natural habitat (e.g., forest as opposed to a parking lot), the NRC expects that biological surveys will be conducted to document associated vegetation communities, plants, wildlife, and wetlands, rare plant and animal species, etc. The NRC also expects that documentation of Duke's consultation with the South Carolina Natural Heritage Program and U.S. Fish and Wildlife Service would be provided.

Permit-related information on avoidance, minimization, and mitigation may not be included in the current Environmental Impact Statement (EIS), because Duke plans to obtain the Clean Water Act 401 and 404 permits in 2010, about the same time the EIS would be final.

The effect on the Broad River shoreline and associated wildlife of drawdown of the Broad River in low water periods was discussed with Duke. For the maximum and minimum permissible flows of the Broad River, Duke suggested looking at the Federal Energy Regulatory Commission (FERC) relicensing documentation for Ninety-Nine Islands Dam. The drawdown of the Broad River happens every summer and is especially severe during dry years. Low flows in the river would also not be a new phenomenon to wildlife, as low flows occur in dry years, which seem to happen about every 5 years in the recent past (last 20 years). In addition, the shoreline along the site

is fairly steep and does not support shoreline areas that would be used by wildlife that would be sensitive to such drawdown, e.g., waterfowl nesting areas, etc.

Duke said no field work on the two proposed transmission corridors would be possible prior to the 2009 field season because the property would not be acquired before then. Wetland permitting would take place after field work. Thus, site-specific consultation, field survey, and wetland permitting information would not be available for the draft EIS.

### Hydrology

The major hydrologic features in the area consist of the Broad River and two ponds created during construction of the Cherokee facility. During the tour of the Lee Site, the Broad River, where the intake structure would be located, was viewed. The exact design of the intake structure and pump house along with shoreline protection is not known at this time.

During the hydrology breakout session, Duke provided supplemental information on sedimentation issues with intake and discharge structures, hydrologic impacts to wetlands, regional water mass balance associated with the various operational modes, the historic discharge characteristics of the Broad River, water use and impacts during construction, and water usage trends and supply anticipated after the plant begins operation. Also discussed were gauging station data, surface and groundwater monitoring programs, groundwater aquifers, regional and local groundwater use, and water quality. Discussions included precipitation-driven runoff, sediment erosion, and other surface water features and events that might impact the environment during construction and operation. The characteristics and operations of the holding ponds and intake and discharge structures during times of drought were discussed as well as the bathymetry, and thermal and chemical releases to the Broad River.

The current dewatering campaign began on December 19, 2005. Duke's position is that the dewatering envelope does not reach the ponds, and if it did, the ponds would isolate further influences. Further discussion regarding the potential impact of Pond B impacts on neighboring wetlands cannot be addressed by hydrology alone and must engage terrestrial ecology staff. Duke's initial explanation is that wetlands are fed by existing streams discharging into the ponds and they would not be altered by drawdown.

There are no permits required in South Carolina for the withdrawal of water from the river, but there is a reporting requirement for withdrawals above a stated threshold. Therefore, the flow requirements for the Broad River at Ninety-Nine Islands Dam are the only regulatory restrictions or constraints on water withdrawal at the Lee Site today. Duke's interpretation of Section 316(b) of the Clean Water Act is that it only addresses withdrawal for cooling towers. The low river discharge limit for plant operation may depend on both Duke's analysis and permits negotiated with regulators.

Duke was asked to provide a summary of the process followed to evaluate the groundwater system, movement, and plausible alternative groundwater pathways. Duke was asked to provide a trend analysis/sensitivity study on the impact of drought conditions on the operation of the Lee Nuclear Power Plant. The basis for this request is to examine a shorter period of record that may be indicative of "climate change" and may be more applicable to the operating period of the plant if the climate was entering a lower than anticipated precipitation trough in the climatic record.

## Socioeconomics and Environmental Justice

Prior to the site audit, NRC staff accompanied by PNNL staff conducted a series of interviews in Cherokee County, South Carolina. The topics covered during these interviews included regional socioeconomic issues and issues related to environmental justice. Some of the interviewees were also revisited during the formal site audit process in April/May, 2008. On April 28, 2008, prior to the site audit, meetings were held with York, Cherokee, Cleveland County and Cherokee County School District officials. The specifics of these meetings will be addressed in a separate socioeconomics report that will be the basis for referencing in the EIS.

The socioeconomics team toured the Lee Nuclear Station Site and visited the nearby access points to the Broad River. They drove to the site on one of the more likely routes, Highway 329 off of I-85, and then turned on McKowns Mountain Road. All roads are in good condition; however, McKowns Mountain Road, currently the only access road to the site, is in fair condition and is a relatively narrow road with no substantial shoulder on either side. If this remains the only access road in this area throughout construction, there would likely be congestion and degradation issues that would arise without some form of mitigation.

Discussions with Duke and contractor representatives (Enercon) highlighted the major socioeconomic issues identified related to construction and operation of a nuclear plant on the Lee Site. The primary issues related to the underlying demographic assumptions of the estimates of in-migrating construction workers (and the assumed geographic distribution) as well as the impacts on McKowns Mountain Road and its residents. Duke is in the process of preparing a transportation assessment, excerpts of which would be made available.

In December 2005, Duke entered into an in-lieu of taxes arrangement with Cherokee County, which is permitted by South Carolina law. This means that they can negotiate some in-lieu of tax arrangement with Cherokee County which replaces the conventional property taxes. As part of this tax agreement, all construction activities are exempted (i.e., the value of the property does not change as construction progresses); however, Duke would continue to pay taxes on the property of the site during construction.

## Cultural Resources

Duke provided a general tour of the proposed construction areas (intake area, met tower area, etc). At each location clarification of cultural resources issues was requested. Lithic scatters identified in the 1970s that have not already been destroyed would be avoided. Currently the plan at the Ninety-Nine Islands Dam is to design the discharge structure in a manner that it cannot be seen, by placing piping below water-level to minimize impacts. Assessment of impacts to the dam has not been completed.

On May 1, 2008, NRC staff visited the State Historic Preservation Office (SHPO) to gather input and copy records for above ground resources. The SHPO expressed concern about the lack of formal agreement for future work or cultural resources procedures, stating that this is an issue that is typically resolved via a formal National Historic Protection Act Programmatic Agreement. The SHPO also identified Cherokee

County Historical Society and the Seminole Tribe as stakeholders that would have an interest in the Lee combined license application.

A visit to the Department of Archives and SHPO provided the opportunity to review the Records and Cultural Resources Information System, and get copies of above-ground survey reports. At the South Carolina Institute of Archaeology and Anthropology, staff examined archaeological site forms for sites recorded on the Lee Plant and in the vicinity of the Lee Plant.

### Land Use

During the site tour concerns were raised about highway traffic at the rail crossing (transportation concern), and extension of the transmission line right-of-way (ROW) into a low lying/wet land area to the north of the cogeneration plant. Additional identified concerns included the rail switching location in East Gaffney (transportation concern) and the proposed corridors for waste water service to and from the plant along the McKowns Mountain Road.

In discussions of land-use considerations and information needs, portions of the meeting coincided with the socioeconomic discussions regarding the transportation assessment and infrastructure (waste water) corridors. The transportation assessment is currently being developed, and a civil engineering assessment was available for viewing that included proposed waste water corridor and available capacity at local waste water treatment plants. The only restrictions that would remain in place regarding access corridors are those limiting structures or plantings that would interfere with overhead transmission lines. Access to the plant would remain unchanged.

Duke supplied engineered drawings of ROW extension at the Cherokee Cogeneration location and appropriate mitigation measures. Follow up questions included management of traffic flow at the railroad crossing on Highway 329, Peoples Creek Road, and 13<sup>th</sup> Street in East Gaffney. It was indicated by the applicant that railroad traffic will be intermittent and crossing arms were not required at any single location. Existing road ratings are included as part of a proprietary transportation assessment being conducted, and we have requested excerpts from analysis related to road ratings and/or route changes.

Discussions were held on the Southeastern Electric Reliability Council (SERC)/Virginia-Carolinas (VACAR) Subregion Reliability Plan. Existing high voltage (HV) transmission lines running east-west would serve to carry the additional capacity produced by Lee. There are current transmission constraints in the VACAR and construction of over 2,000 additional projected miles of HV lines (>230 kV) has been proposed for the next ten year period. SERC is currently a net exporter of power, primarily to the Florida Reliability Coordinating Council (FRCC) region to the south at over 2,000 MW. It is important to note that this only includes firm transactions when considering capacity margins, indicating that it is likely the number is higher given the large uncommitted generator capacity.

## Need for Power

Given that it has a firm power purchase agreement (PPA) with capacity outside of the service territory, Duke was asked to provide data regarding all merchant capacity (committed and un-committed), capacity factors, and firm power purchase agreements which could serve to service native load. Duke was asked to address the expected increase or decrease in firm PPAs during the time up to commercial operation of Lee Nuclear Station, and provide an estimate of short term/non-firm wholesale sales exported out of the service territory. In consideration of the applicant filing preliminary Certificates of Public Convenience and Necessity (CPCN) for Cliffside Station (up to 1600 MW in 2011) and Buck River (up to 600 MW), the applicant was requested to provide reserve/capacity margin estimates.

Discussions were held on how Duke fits into the flow of power in SERC/VACAR, and the gap between Duke's available capacity and new predictions of adequate reserve margins out to 2016. When asked to address third-party information (NERC 2007-2016 Long Term Reliability Assessment) that indicates there is adequate reserve margin across the region with a single new nuclear resource of 1600 MW estimated to come on-line in 2015, Duke indicated that the SERC estimate included an interconnect agreement for Lee (filed by the previous 'joint owner').

## Alternatives

During discussions of power alternatives, the applicant was requested to consider base loaded natural gas as a viable alternative, provide quantified exclusionary data, and fixed/variable costs associated with this alternative. Applicant was also requested to provide references for exclusion of several alternative sources of power (biomass, solar, IGCC).

Duke's contractors presented their alternative site selection process and validation methodology. Because different weighting factors and rankings were used when screening for the 15 potential sites than when evaluating the seven candidate sites and four final sites, Duke was asked to justify this weighting and ranking process, which was said to use EPRI criteria. All used EPRI criteria; the change in weighting provided inconsistent results.

In a discussion of alternative systems, Duke noted (page 9.4-7 of the Environmental Report) that "the U.S. Environmental Protection Agency does not consider the wet-dry cooling system as a candidate best available technology for heat dissipation at new generating plants of the size proposed for the Lee Nuclear Site." One reason given included the lack of adequate demonstration of this technology's use at similarly sized power plants. Duke was asked to provide a write-up of the wet-dry (hybrid) cooling tower technology relative to the Lee application, which should focus on the size of plant, plume abatement, and the timing of water conservation need.

## Meteorology, Air Quality, and Noise

Discussions were held on meteorology, air quality, noise, and cooling towers. Discussions of meteorological questions submitted prior to the audit were completed,



and the documentation for PAVAN simulations was reviewed. The input and output files for PAVAN, SACTI, and XOQDOQ were requested, as well as estimates of noise levels for individuals on the Broad River and at the nearest residence. In addition, information about additional permitted air-pollution sources in the area and additional information to evaluate the air quality impacts of added traffic due to construction and operation was requested.

### Accidents

Meteorological issues of concern that were discussed (related to accident analysis) involved the representativeness of the meteorological data used in the Environmental Report and discussion of data recovery rates. Duke agreed to conduct further analysis on wind direction to better understand why differences exist between onsite measurements and other station measurements within the region. The differences appear to be due to local flows that form in the river valley, especially during stable conditions. Documentation was provided for review of instrument types, measurement specifications, maintenance, and calibration procedures. This documentation established a data recovery rate in excess of 90%.

The X/Q values presented in the environmental report used the AP1000 Design Control Document (DCD) Rev. 15 building dimensions instead of Rev. 16 values. Duke stated they had conducted a sensitivity study in their calculation package and this difference caused only a small change in the computed X/Q values. The calculation package was reviewed, and a request was made to provide the X/Q values using the Rev. 16 values.

The MACCS2 calculation package was reviewed, and a request was made to provide accident-specific risks tables for early/latent fatalities and affected land and for the water ingestion pathway, and for the total risk. In addition, a request was made for more discussion on both the surface and ground water pathways in the Environmental Report. No major design basis or severe accident issues remain.

### Radwaste Systems, Radiological Health Impacts of Construction and Operation, Decommissioning, and Uranium Fuel Cycle Impacts

The Environmental Report uses the AP1000 DCD Rev. 16 design for worker dose calculations. Worker doses were calculated as the result of atmospheric releases from the other operating unit. The releases were assumed to be from the building vent (modeled as ground level) and received at the shield building on the other unit. Releases were based on 2080 hours/year to 2100 workers. Occupational exposure estimates for the EIS may be derived from the Design Certification Documentation (DCD), Chapter 12.4.

For radiological waste the Environmental Report uses only the DCD generic options. Analyses are based on the DCD-provided generic source terms, which assume that skid-mounted transportable components will be used. The Environmental Report also accepts the DCD assertion that external direct dose rates are negligible. There is a potential for on-site dry cask storage. The Lee Nuclear Plant would be included in the Atlantic Compact, so closure of Barnwell waste site to outsiders has no impact.

The calculation packages for XOQDOQ, LADTAP, and GASPAR were reviewed, as well as dispersion estimates based on meteorological data from Dec 2005-Nov 2006. Most of the atmospheric dispersion calculations (and the doses that are based on them) are actually from the DCD Rev. 15, although the Environmental Report references Rev. 16. Sensitivity analyses were performed (and reviewed on this trip) that indicate small (generally less than 5%) changes, and Duke determined that these were not significant. However, referencing the calculations properly will be difficult.

Referencing the calculations properly will be difficult because the LADTAP and GASPAR input/output files were still pending, and the GASPAR runs were not made by the applicant, but by a contractor. These runs were part of a separate ALARA analysis, which became the baseline case in the ALARA analysis input for the ER. Neither Duke or its contractor, Enercon, had the actual calculations. Additionally, the GASPAR calculation package had several conflicting parts (on irrigation and aquaculture) that ultimately were not used. Though the LADTAP results were conservative at 19,293,422 person hours of external exposure, the LADTAP calculations included input parameters without proper support as to how the calculations were obtained.

Finally, since all of the calculations were based on DCD Rev 15, and the application is for DCD Rev 16, and none of the analyses presented use Rev 16 data, then sensitivity analyses of the revisions may not be straight forward enough to demonstrate the validity of the calculations from Rev. 15 to Rev 16.

The Radiological Environmental Monitoring Program (REMP) will be based on NUREG-1301. The Environmental Report references the Lee Nuclear Station Offsite Dose Calculation Manual (ODCM), which does not yet exist. The Nuclear Energy Institute (NEI) is developing a generic ODCM which the applicant plans to cite and use at Lee.

Duke has a centralized environmental monitoring program, with one central laboratory at the McGuire site. Samples are collected by Duke employees or by contract employees under Duke control. Duke and South Carolina are establishing a split-sample program. South Carolina already has thermoluminescent dosimeters (TLDs) and air samplers around the other reactor sites. Lee is committing to use Regulatory Guide 4.15 Rev. 1. A Rev. 2 is available, but there is no regulatory requirement to use it. A publicly-available, docketed report "Catawba Nuclear Station Units 1 and 2, Annual Radiological Environmental Monitoring Report 2006," which contains a description of the program quality assurance, laboratory intercomparison results, the TLD cross check with Nuclear Technology Services, and acceptance criteria was provided to the audit team by Duke. Duke has not yet started pre-operational monitoring.

### Transportation

Transportation discussions were not included in the site audit in Charlotte, North Carolina, but the review of the Duke transportation analysis material in a reading room in Richland, Washington was considered part of the audit. Transportation material from the applicant was reviewed with Wayne Schofield (Dade Moeller and Associates [DMA]) on May 7, 2008 and May 8, 2008, in the DMA offices in Richland, Washington. The review included Sections 3.8 and 7.4 of the Environmental Report along with the supporting calculation package, including TRAGIS and RADTRAN input and output files.

An analysis of the transportation of radioactive material by truck accident rates typically uses Saricks and Thompkins, 1999 for state-specific accident, injury and fatality rate data. A review of the accident rate data used for the Lee analysis indicates that the applicant updated the state-specific accident rate data with Department of Transportation (DOT) data that is available via the internet. The updated data estimated an increase in accident rates as large as a factor of 60 (State of Mississippi). However, the data taken from the DOT web page is representative of all trucks and may not be appropriate for trucks that would be used to transport spent nuclear fuel (SNF). Further, recent efforts for the Yucca Mountain transportation analysis update revealed that the Federal Motor Carrier Safety Administration has evaluated the data in the Motor Carrier Management Information System and found that for 1994 through 1996 that accidents were underreported by about 39 percent and fatalities were underreported by about 36 percent (UMTRI 2003, Table 1, p.4, and Table 2, p. 6). Therefore, in the update to the Yucca Mountain EIS, DOE increased the state-specific truck accident and fatalities rates by factors of 1.64 and 1.57, respectively, to account for the underreporting. It was suggested that Duke update its state-specific accident, injury and fatality rate data using the corrected data.

Although shipments of SNF shipments from the Lee Nuclear Station would not start until well beyond 2010 and continue possibly 30 years or more into the future, the population data used was from the 2000 Census data. An escalation factor may be used to adjust the population densities by state to account for population growth for the time frame SNF shipments would be expected from the William Lee Nuclear Station.

Inconsistencies were noted between Table 3-1 data of the Duke Transportation calculation package and the RADTRAN input file, and between the calculation package text and Figure 2-1. A number of other statements were identified that may need clarification.